[001] METHOD AND DEVICE FOR PREVENTING A STATIONARY VEHICLE FROM UNINTENTIONALLY ROLLING

[002]

[003]

[004] The invention concerns a method and a device to prevent a stationary vehicle from unintentionally rolling away, wherein the said method and device are more closely defined in the principal concept of claim 1.

[005]

[006] Many methods and devices conforming to the state of the technology are known for the prevention of a stationary vehicle unintentionally rolling away, which exhibit different ways of preventing a vehicle from rolling away.

[007] For example, DE 101 51 846 A1 discloses a method and a device for the prevention of an unintended rolling away of a stationary vehicle, wherein a driver is enabled to very simply deactivate the pressure to a holding brake, which brake performs the desired function. In doing this, first, in the case of a stationary vehicle, a holding mode is initiated upon the activation of a brake pedal in which at least one wheel brake apparatus of the vehicle is controllingly commanded to produce a braking force so that the vehicle is automatically held fixed from further movement and cannot inadvertently roll away. This holding mode can also be deactivated by a second activation of the brake pedal.

[008] In the case of a secure braking of the vehicle on an incline by way of the described method and in accordance with the state of the technology, a dangerous situation can arise if the driver leaves the driver's seat with the presupposed idea that the vehicle is securely braked by the augmented startup gearing. In the case of a fault in this described holding method, it is possible that a reverse rolling of the vehicle could occur, especially when a clutch is not, as expected, fully closed. Further, it is necessary for the driver to activate this holding function by way of repeated pressings of continually increasing force on the brake pedal, which brings about an additional safety risk.

[009] The present invention has the purpose of presenting a method and a device for preventing a stationary vehicle of unintentionally rolling away, which is immediately activated upon the stopping of the vehicle and, which invented method and device, allow the activation of a holding function without excessive technical involvement even in a case of a fault (as cited above) in the startup gearing, such as an unexpected failure of a clutch to close.

[010] The purpose of the invention is achieved by a generic method and a device for the prevention of a stationary vehicle to inadvertently roll away.

[011]

[012] By using a clutch displacement as a characteristic value to serve as a determinant for an actual torque takeover by a clutch, which procedure can also be automatic, it is possible that the brakes release themselves, in accordance with a specified release criterion. The threshold of release can be set independently of vehicle and driving criteria, such as the weight of the vehicle or the incline of the parking surface. In this operation, the brakes release as soon as the clutch displacement oversteps a predetermined threshold value. Dependent upon the operational condition, such as during startup or when maneuvering, the predetermined threshold values can be so fixed that the release criterion can function optionally in any state of operation. By way of this interaction, assurance may be guaranteed that the vehicle does not roll away in a reverse direction, when the holding function is deactivated. Furthermore, it is among the advantages of the present invention that the holding function remains secure, even in a case of an eventual fault in the startup gearing, which would lead to a situation wherein the clutch has not been (as was expected) closed, although the clutch pedal was activated. The existing brake system pressure can be increased at any time by way of a non-return check-valve. In addition, a light pressure on the brake pedal suffices in assuring that the vehicle is securely immobilized. In order to cope with a situation wherein a driver leaves the vehicle when the holding brake has not been activated, it is possible that the holding function can be augmented with a specified time-delay period. Thereby, the brake can be released even when, for

a known predetermined time period, no foot pedal has been activated. This time period would be advantageously so adjusted that the vehicle driver cannot not leave the vehicle unless the brake had not been previously released and thereby the vehicle would slowly roll backwards. Subsequently, if a stopped condition of the vehicle is made known and the transmission is not in the neutral position and the brake pedal is pressed, then the controlled brake pressure will maintain itself for a period following the release of the brake pedal until the clutch has reached a specified position. If, after the release of the brake pedal, the accelerator pedal is not activated, then the brake releases after a specified time period.

[013] The holding function can exert control both by way of a valve with a digitally controlled outlet and also generate a CAN-data delivery which, by way of an appropriately equipped EBS system, is interpreted and acted upon. The recognition as to whether or not such a system is present and the associated selection of the input and output values can be done automatically. In order to achieve the greatest possible comfort upon the release of the brake, the exact moment of the holding period can be determined in order to avoid a release-jump and to prevent the vehicle from rolling backwards, which can occur if the brake is released too early. For this purpose, particular driving resistances are input into the transmission control, which would include the characteristic values of the actual vehicle weight and the degree of the current incline of the road surface. The necessary holding moment for that torque can be computed from these values.

[14] Since the clutch displacement is proportionally related to the transition time, the brakes can be released by the electronic control at precisely that point when the clutch attains the necessary torque which is required to hold the vehicle at the actual incline. Since all necessary data is already in the transmission control, this embodiment of the invention can be produced without added sensors and, therefore, in an economical manner. Advantageous and useful embodiments of the invention are stated in the subordinate claims. The invention, however, is not limited to the combination of features of the claims, but much more makes

available to the expert additional advantageous combination possibilities of claims and individual features of the claims from the statement of purpose.

[15] BRIEF DESCRIPTION OF THE DRAWINGS

[16] In the following, the invention will be explained in greater detail with the aid of one embodiment shown in the figure (Fig. 1/1).

[17]

[18]

[19] This single Figure shows a schematic presentation of an invented method and also an invented device for preventing a stationary vehicle from unintentionally rolling away using an EBS 3. When a brake pedal 1 is activated, then the brake pedal position 2 is transferred to an EBS 3. By way of a stoplight switch 4, a motor control unit 5 forwards a signal 6 as a CAN-signal 7 to a transmission control unit 8. In addition, simultaneously from the same EBS 3, via a CAN-signal 9, the position of a brake pedal 1 is sent to the transmission control unit 8. The transmission control unit 8 sends a signal 10 back to the EBS 3 for the activation of a holding mode and a brake 11 can be altered via brake-pressure. In a supplementary brake circuit, it is possible that the brake 11 can also be activated by a memory 12 via activating the brake pedal 1.

Reference numerals

1	brake pedal
2	brake pedal position
3	EBS
4	stoplight switch
5	motor control unit
6	signal
7	CAN-signal
8	transmission control unit
9	CAN-signal
10	CAN-signal
11	brake
12	memory